The Distribution and Island Endemism of Hawaiian Delphacidae (Homoptera) with Additional Lists of Their Food Plants.

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(Presented at the meeting of December 1, 1921.)

In presenting the following tables as a guide and check list to such as may be interested in this group of our endemic leaf-hoppers, the compiler wishes to digress somewhat from the introductory remarks which such tables might ordinarily occasion. Because our endemic leaf-hoppers, like some others elsewhere, do not particularly affect agricultural interests, and therefore are of no special economic importance, some may wonder why so much interest is taken in their biology and morphology by our local entomologists. There are several reasons for this. First, because of several very injurious species of hoppers, not so very far from our gates, which as yet have not reached Hawaii; and, second, because the sugar cane leaf-hopper (*Perkinsiella saccharicida*), which cost this Territory losses of many millions of dollars in 1903, 1904 and subsequent years, is, as it were, the foundation-stone of economic entomology in Hawaii. Not only was this Delphacid responsible for large money losses, but it was also the cause for organizing in 1903 of a large staff of entomologists for biological research and field work in the Territory, and the building up of such organizations as the Experimental Station of the Hawaiian Sugar Planters' Association and the Territorial Board of Agriculture and Forestry and its Plant Quarantine and Inspection Department. It is therefore not surprising that the many families and groups of leaf-hoppers distributed through both continents are of more than passing interest to some of our systematic as well as economic workers. The systematic study of these families or groups, whether local or foreign, is quite necessary because, with Hawaii as the "Cross Roads of the Pacific" and in almost daily steamship communication with many tropical or sub-tropical regions, there is always the possibility that one or more of several known species of hoppers

or other injurious insects may be accidentally introduced. In this connection, as an instance, it might here be recorded that in 1913 Mr. J. C. Bridwell, while in Nigeria, West Africa, collected there among other material for study in Honolulu, a small Delphacid, allied to our own sugar cane leaf-hopper, which Mr. Muir later described as *Megamelus flavolineatus*. During the past year Mr. Muir has received collections of leaf-hoppers from Porto Rico (where insects of some sort are carrying mosaic disease in sugar cane) and among these he found this West African species of which Mr. Wolcott, the entomologist in Porto Rico, remarks: "The identification of *M. flavolineatus* was especially fortunate, as this is a cane insect which may become a serious pest." The fact, therefore, that these insects convey many plant diseases also makes their study necessary for economic work. Knowledge acquired purely from scientific studies sooner or later is the foundation of applied practices, as is well instanced in the "Fauna Hawaiiensis," without which we never could have handled our local entomological problems with the same degree of certainty.

The present tables summarize our knowledge of the distribution of the endemic Delphacidae in our islands and further adds to the lists of their food plants as previously published.* As is to be expected, the species having *all* or many long-winged forms have a wider distribution than those having only a few or *no* long-winged forms. The comparative paucity of *Alohini* on Kauai and comparative richness of *Leialohini* is of interest and may indicate that that island was separated from the others before the arrival of Delphacidae in the Archipelago. The distribution shows the value of segregation in species formation, which fact is also shown by the lists of food plants. Those species living on two or more plants show much greater variability than those confined to a single plant. When we consider the topography of the islands, the isolated distribution of many plants and the fact that so many species are represented only by short-winged forms or by only an occasional long-winged form, we can see how isolation can take place even on the same island.

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* Proc. Haw. Ent. Soc. III, No. 4, May, 1917, p. 339 et seq.

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(1) Fauna Hawaiiensis, 1908, Vol. II, Part 6.
(2) Proc. Haw. Ent. Soc., 1905-1907, Vol. I, Parts 1-5.
(2a) *op. cit.* 1910, Vol. II, Part 3.
(3) *op. cit.* 1916, Vol. III, Part 3.
(4) *op. cit.* 1917, Vol. III, Part 4.
(5) *op. cit.* 1918, Vol. III, Part 5.
(6) *op. cit.* 1919, Vol. IV, Part 1.
(7) *op. cit.* 1921, Vol. IV, Part 3.
(8) *op. cit.* 1922, Vol. V, Part 1.

* The references include only such papers as give descriptions, notes, and observations.

TABLE I.

Island Distribution of Hawaiian Delphacidae *

ALOHINI	Macropterous Form		Brachypterous Form		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Bibliography†
	Male	Female	Male	Female							
Leialoha											
naniicola..........(Kirk)	X	X	....	....	...	X	...	...	...	X	(1) p. 580; (3) p. 172
lehuae..........(Kirk)	X	X	....	....	X	X	...	X	...	...	(1) p. 581; (3) p. 172; (8) p. 91
oahuensis..........Muir	X	X	....	....	...	X	...	X	...	...	(3) 173; (4) 300
hawaiiensis..........Muir	X	X	....	....	...	...	...	...	...	X	(3) 173; (4) 300; (5) 409
mauiensis..........Muir	X	X	....	....	...	...	...	...	X	...	(6) 87; (7) 509
lanaiensis..........Muir	X	X	....	....	...	...	...	X	...	...	(4) 299
kauaiensis..........Muir	X	X	....	....	X	...	...	...	...	...	(3) 173; (8) 93
suttoniae..........Muir	X	X	....	....	X	...	...	...	...	...	(8) 92
scaevolae..........Muir	X	X	....	....	X	...	...	...	...	...	(8) 93
ohiae..........(Kirk)	X	X	....	....	X	X	...	...	...	X	(1) 581; (3) 174
oceanides..........(Kirk)	X	X	....	....	X	...	...	...	...	...	(1) 580 (Aloha); (3) 174; (8) 92
pacifica..........(Kirk)	....	X	....	....	?	...	?	...	...	...	(1) 581
Nesodryas											
freycinetiae..........Kirk	X	X	....	....	...	X	...	...	...	...	(1) 596; (3) 175
giffardi..........Kirk	X	X	....	....	...	X	...	...	...	...	(1) 597; (3) 175
elaeocarpi..........Kirk	X	X	....	....	...	X	...	...	...	...	(1) 596; (3) 175
eugeniae..........Kirk	X	X	....	....	...	X	...	X	...	...	(1) 597; (3) 175; (4) 301
antidesmae..........Muir	X	X	....	....	...	X	...	...	...	...	(4) 300
dodonaeae..........Muir	X	X	....	....	X	...	...	...	...	...	(3) 176; (8) 95
Nesodryas (Nesothoë)											
fletus..........(Kirk)	X	X	....	....	...	...	...	X	X	...	(1) 592; (3) 176; (4) 302; (6) 87
dryope..........Kirk	X	X	....	....	X	X	...	...	...	X	(1) 597; (3) 176; (4) 301; (5) 409
haa..........Muir	X	X	....	....	...	...	...	...	...	X	(7) 509
munroi..........Muir	X	X	....	....	...	...	...	X	...	X	(4) 303; (6) 87
gulicki..........Muir	X	X	....	....	...	X	...	...	...	X	(3) 177; (4) 301; (6) 87
alboguttata..........Muir	X	....	....	....	X	...	...	...	...	...	(8) 94
semialba..........Muir	X	X	....	....	X	...	...	...	...	...	(8) 95
terryi..........(Kirk)	X	X	....	....	...	X	...	...	...	...	(1) 594; (4) 301
bobeae..........(Kirk)	X	X	....	....	...	X	...	...	...	...	(1) 593; (3) 177
piilani..........(Kirk)	X	X	....	....	...	...	X	X	...	...	(1) 594; (3) 178; (4) 301
maculata..........Muir	X	X	....	....	...	...	...	X	...	X	(3) 177; [illegible] 302; [illegible] 409
perkinsi..........(Kirk)	X	X	....	....	...	X	...	...	...	...	(1) 593; (3) 178
seminigrofrons..........Muir	X	X	....	....	X	...	...	...	...	...	(8) 94
hula..........(Kirk)	X	X	....	....	X	...	...	...	...	...	(1) 592; (3) 178; (8) 93
laka..........(Kirk)	X	X	....	....	...	...	...	...	X	...	(1) 594; (3) 178; (6) 87

*Islands showing ? mark opposite three species are included in the summaries and *tables of* island endemism.

†See page 105 for list of references.

TABLE I—Continued.

ALOHINI	Macropterous Form		Brachypterous Form		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Bibliography
	Male	Female	Male	Female							
Nesodryas (Nesothoë)—contd.											
pluvialis............(Kirk)		X			X						(1) 595; (3) 178
silvestris............(Kirk)		X						X			(1) 595; (3) 178
frigidula............(Kirk)		X								X	(1) 593; (3) 178
Aloha											
ipomoeae............Kirk		X	X	X	X	X	X	X	X	X	(1) 581; (3) 178; (6) 88
myoporicola.........Kirk			X	X				X		X	(1) 581; (3) 179; (4) 303; (5) 410; (7) 510
plectranthi..........Muir			X	X		X					(3) 179
kirkaldyi............Muir			X	X		X					(3) 180
swezeyi..............Muir		X	X	X	X	X				X	(3) 180; (4) 303; (5) 410; (8) 96
flavocollaris.........Muir			X	X		X					(3) 181
dubautiae...........(Kirk)			X	X		X					(1) 583 (Nesopleias); (3) 182
artemisiae..........(Kirk)			X	X		X					(2a) 118 (Nesopleias); (3) 182
campylothecae.......Muir			X	X		X					(3) 183; (4) 303
Nesorestias											
filicicola.............Kirk			X	X		X					(1) 583
nimbata............(Kirk)			X	X		X					(1) 582
Nothorestias											
badia................Muir			X			X					(4) 304
swezeyi..............Muir			X	X		X					(8) 87
Dictyophorodelphax											
mirabilis..........Swezey			X	X		X					(2) 104; (3) 184; (4) 279
swezeyi............Bridwell			X	X		X					(5) 386
praedicta..........Bridwell			X	X					X		(6) 72
Ilburnia											
koae................(Kirk)	X	X	X	X	?	X				X	(1) 583; (2) 161, 208 fig.; (3) 185; (5) 410
rubescens...........(Kirk)	X	X			X	X			X	X	(1) 584; (2) 202; (5) 411; (6) 90; (8) 96
rubescens var. pulla.(Muir)	X	X				X				X	(3) 186; (5) 411
koae-phylodii ......(Muir)	X	X			X	?					(3) 186; (8) 96
pilo..................Muir		X	X	X					X		(8) 99
coprosmicola ....Muir			X	X						X	(6) 103; (7) 516
pseudo-rubescens...(Muir)	X	X							X	X	(3) 186; (5) 411; (6) 88
swezeyi.............(Muir)			X			X					(3) 187
anceps..............(Muir)			X	X						X	(3) 187; (5) 411
nephelias...........(Kirk)			X	X				X			(1) 588; (3) 197; (4) 308
nigriceps...........(Muir)			X	X				X			(4) 308
cyrtandricola.......(Muir)			X	X						X	(5) 406, 412
dubautiae...........Muir			X	X					X		(7) 510
pele................(Kirk)	X	X								X	(1) 585; (3) 188; (4) 304
raillardicola.........Muir			X	X					X		(6) 102

TABLE I—Continued.

ALOHINI	Macropterous Form		Brachypterous Form		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Bibliography
	Male	Female	Male	Female							
Ilburnia—continued											
nesopele............Muir			X	X					X		(7) 511
oahuensis...........(Muir)			X	X		X					(3) 188
stenogynicola........Muir			X	X					X		(6) 94
campylothecae......Muir			X	X	X						(8) 97
mamake.............Muir			X	X					X		(6) 101
cyrtandrae..........(Muir)			X						X		(3) 189
timberlakei.........(Muir)			X			X					(4) 304
phyllostegiae........(Muir)		X	X	X						X	(5) 405, 412
kokolau.............Muir			X	X					X		(6) 95
neocyrtandrae.......Muir			X	X					X		(6) 100
gouldiae............(Kirk)			X	X		X					(1) 586; (3) 189
nephrolepidis.......(Kirk)			X	X		X				X	(1) 586; (2) 203; (3) 189
blackburni..........(Muir)	X	X	X	X		X			X	X	(3) 189; (4) 308; (5) 411; (6) 108; (7) 514
curvata.............Muir			X						X		(6) 96
aku.................Muir			X	X						X	(7) 513
perkinsi............(Muir)			X						X		(3) 190
nesogunnerae........(Muir)			X	X				X			(4) 305
gunnerae........... Muir)			X	X		X					(4) 305
disjuncta........... Muir)			X	X				X			(4) 306
amamau.............Muir			X	X					X		(7) 512
painiu..............Muir			X	X					X		(6) 102
neowailupensis......Muir			X	X		X					(3) 191 (N. wailupensis); (6) 108
lobeliae............(Muir)			X	X		X					(3) 212; (4) 306; (6) 108; (7) 520
waikamoiensis.......Muir			X	X					X		(6) 97; (7) 514
wailupensis.........(Muir)			X	X		X					(3) 181 (Aloha)
boehmeriae..........Muir			X	X		X					(7) 514
viridis..............Muir			X	X	X						(8) 99
kuschei.............Muir			X	X	X						(8) 96
pipturi.............(Kirk)			X	X		X	X				(1) 584; (1) 202; (3) 191
chambersi..........(Kirk)			X	X						X	(1) 590; (1) 202; (3) 192; (7) 515
osborni.............(Muir)			X	X					X		(3) 192; (6) 99
acuta...............Muir			X	X					X		(6) 96
geranii..............Muir			X	X					X		(7) 515
naenae.............Muir			X	X	X						(8) 98
cyathodis...........(Kirk)			X	X						X	(1) 589; (3) 192; (6) 91
var. fullawayi.....(Muir)			X	X			X				(3) 192; (6) 91
var. lanaiensis....(Muir)			X	X				X	X		(4) 309; (6) 92
var. nigrinervis....Muir			X	X					X		(6) 92
var. eeke..........Muir			X	X					X		(6) 92
incommoda.........(Muir)			X	X		X					(3) 193
ahinahina...........Muir			X						X		(6) 98 (pulla); (8)
mauiensis...........Muir			X	X					X		(6) 99
sulcata..............Muir			X	X					X		(7) 516
leahi...............(Kirk)	X	X	X	X	X	X					Ent. 1904 p. 176 (Megamelus) (2) 202; (3) 193

TABLE I—Continued.

ALOHINI	Macropterous Form		Brachypterous Form		Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Bibliography
	Male	Female	Male	Female							
Ilburnia—continued											
monticola (Kirk)			X	X					X		(1) 591; (3) 197; (6) 90
raillardiae (Kirk)		X	X	X						X	(1) 590; (2) 203; (3) 194; (4) 309; (7) 516
coprosmae Muir			X	X					X		(6) 93
neoraillardiae Muir			X	X						X	(7) 517
ipomoeicola (Kirk)	X	X	X	X	X	X				X	(1) 586; (2) 202; (3) 194; (5) 412; (7) 517; (8) 96
longipes Muir			X	X					X		(6) 93
halia (Kirk)			X	X		X					(1) 584; (2) 202; (3) 194
giffardi (Muir)			X	X		X					(3) 194
montis-tantalus (Muir)			X	X		X					(3) 195
sharpi (Muir)			X	X		X					(3) 195
asteliae (Muir)			X	X		X					(4) 307
koebelei (Muir)			X			X					(4) 308
gigantea Muir			X			X					(7) 517
rocki (Muir)			X	X		X					(3) 196
haleakala (Kirk)				X					X		(1) 587; (3) 197
argyroxiphii (Kirk)			X	X					X		(1) 590; (2) 203; (3) 197; (6) 89.
procellaris (Kirk)			X	X			X				(1) 588; (3) 197
umbratica (Kirk)	?	?	?	?						X	(1) 585
hamadryas (Kirk)		X				X					(1) 587
palustris (Kirk)			X				X				(1) 589; (2) 202
nubigena (Kirk)			X				X				(1) 589
imbricola (Kirk)			X						X		(1) 590
sola (Muir)			X			X					(4) 307
hamata (Muir)			X	X				X			(4) 309
tetramolopii Muir			X	X					X		(6) 88
bridwelli Muir			X	X					X		(6) 90
olympica Muir			X	X		X					(7) 520
ulehihi Muir			X	X						X	(6) 104
DELPHACINI											
Kelisia											
sporobolicola Kirk		X	X	X	X	X			X	X	(1) 578; (4) 310; (6) 86; (7) 509
var. immaculata Muir			X	X						X	(7) 509
swezeyi Kirk		X	X	X	X	X					(1) 578; (4) 310; (7) 509; (8) 102
eragrosticola Muir		X	X	X					X		(6) 85
emoloa Muir			X	X		X					(4) 311
‡paludum Kirk			X	X		X					(1) 579; (4) 310
Perkinsiella											
‡saccharicida Kirk	X	X	X	X	X	X	X	X	X	X	
Peregrinus											
‡maidis (Ashm.)	X	X	X	X	X	X	X	X	X	X	

‡Introduced species.

TABLE I—Continued.

Summary of Genera and Species Described from all Islands

Genera	Species
Leialoha	12
Nesodryas	6
Nesodryas (Nesothoë)	18
Aloha	9
Nesorestias	2
Nothorestias	2
Dictyophorodelphax	3
Ilburnia	87
†Kelisia	6
*Perkinsiella	1
*Peregrinus	1
Total	147

*Recent introduction.

†One species (K. paludum) cosmopolitan.

TABLE II.

Total Species on Each Island

Genera	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii
Leialoha	7	4	1	3	1	3
Nesodryas	1	5	0	1	0	0
Nesodryas (Nesothoë)	6	5	1	5	2	6
Aloha	2	8	1	2	1	3
Nesorestias	0	2	0	0	0	0
Nothorestias	0	2	0	0	0	0
Dictyophorodelphax	0	2	0	0	1	0
Ilburnia	9	30	5	6	35	19
Kelisia	2	4	0	0	2	2
Perkinsiella	1	1	1	1	1	1
Peregrinus	1	1	1	1	1	1
	29	64	10	19	44	35

TABLE III.

Single Island Endemism*

Islands	Leialoha	Alohae	Delphacini	Tota
Kauai	10	4	0	14
Oahu	6	33	2	41
Molokai	0	3	0	3
Lanai	2	5	0	7
Maui	2	31	1	34
Hawaii	3	13	1	17
	23	89	4	116

*The tables of Island Endemism include Kelisia paludum, a cosmopolitan species, but not the recent introductions, Perkinsiella saccharicida and Peregrinus maidis.

TABLE III—Continued.

Species Included in Single Island Endemism

Genera	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii	Total
Leialoha	4	0	0	1	1	1	7
Nesodryas	1	4	0	0	0	0	5
Nesodryas (Nesothoë)	5	3	0	1	1	2	12
Aloha	0	6	0	0	0	0	6
Nesorestias	0	2	0	0	0	0	2
Nothorestias	0	2	0	0	0	0	2
Dictyophorodelphax	0	2	0	0	1	0	3
Ilburnia	4	20	3	5	30	13	75
Kelisia	0	2	0	0	1	1	4
	14	41	3	7	34	17	116

Species Included in Two Island Endemism

	Leialoha	Nesodryas	Nesodryas (Nesothoë)	Aloha	Ilburnia	Kelisia	Totals
Kauai + Oahu	0	0	0	0	2	1	3
Kauai + Molokai	1	0	0	0	0	0	1
Oahu + Molokai	0	0	0	0	1	0	1
Oahu + Lanai	1	1	0	0	0	0	2
Oahu + Hawaii	1	0	1	0	2	0	4
Molokai + Lanai	0	0	1	0	0	0	1
Molokai + Maui	0	0	0	0	1	0	1
Lanai + Maui	0	0	1	0	1	0	2
Lanai + Hawaii	0	0	2	1	0	0	3
Maui + Hawaii	0	0	0	1	0	0	1
	3	1	5	2	7	1	19

Species Included in Three Island Endemism

	Leialoha	Aloha	Ilburnia	Total
Kauai + Oahu + Lanai	1	0	0	1
Kauai + Oahu + Hawaii	2	1	2	5
Oahu + Maui + Hawaii	0	0	1	1
	3	1	3	7

Species Included in Four Island Endemism

	Ilburnia	Kelisia	Total
Kauai + Oahu + Maui + Hawaii	1	1	2

Species Included in Six Island Endemism

	Aloha
Kauai + Oahu + Molokai + Lanai + Maui + Hawaii	1

TABLE IV.

*Additions to Reference List of Hawaiian Delphacidae With Their Food Plants.†

Leialoha.

L. oahuensis Muir. *Metrosideros polymorpha* (4) long series, Munro, December, 1916.

L. mauiensis Muir. *Coprosma montana* (6) series both sexes and young, Giffard and Fullaway, May, 1918.

L. lanaiensis Muir. *Metrosideros polymorpha* (4) Munro, November, 1916.

L. kauaiensis Muir. *Metrosideros polymorpha* (3) Swezey, February; (8) Swezey, August, 1921.

L. hawaiiensis Muir. *Metrosideros collina polymorpha* (4) long series, with young, January, 1917.

L. suttoniae Muir. *Suttonia sandwicensis* (8) series both sexes, Swezey, August, 1921.

L. scaevolae Muir. *Scaevola chamissoniana* (8) long series, both sexes, August, 1921.

Nesodryas.

N. giffardi Kirk. *Cyrtandra* sp. (4) *Rollandia grandiflora* (4) Giffard, October, 1917.

N. fletus (Kirk.). *Antidesma platyphyllum* (6) one female, May, 1918, Giffard and Fullaway.

N. gulicki Muir. *Euphorbia* sp. (6) series, Giffard and Muir, December, 1918; *Metrosideros collina polymorpha* var. *glaberrima* (6) large series both sexes, August, 1918, Giffard.

N. perkinsi (Kirk.). *Metrosideros polymorpha* var. (4) small series, Giffard and Fullaway, November, 1916.

N. munroi Muir. *Dodonaea viscosa* var. *spathulata* (6) long series both sexes and young, Giffard, July, 1918.

N. piilani (Kirk.). *Osmanthus sandwicensis* (6) Munro, December, 1916.

N. haa Muir. *Antidesma platyphyllum* (7) large series both sexes, August, 1918; January, September, 1919, Giffard.

N. laka (Kirk.). *Sida* sp. (5) small series both sexes and young, Bridwell, August, 1918.

N. hula (Kirk.). *Sideroxylon* sp. (8) series both sexes, Swezey, August, 1921; *Osmanthus* sp. (8) series both sexes, Swezey, August, 1921.

N. seminigrofrons Muir. *Campylotheca* sp. (8) one female, one male, Swezey, August, 1921.

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* Continued from Proc. Haw. Ent. Soc. III, 4, 1917, p. 339 et seq.

† (*3*) refers to Proc. Haw. Ent. Soc. 1916, III, 3; (*4*) op. cit. 1917, III, 4; (*5*) op. cit. 1918, III, 5; (*6*) op. cit. 1919, IV, 1; (*7*) op. cit. 1921, IV, 3; (*8*) op. cit. 1922, V, 1.

N. alboguttata Muir. *Antidesma* sp. (8) one male, Swezey, August, 1921.

N. semialba Muir. *Osmanthus* sp. (8) one female, one male, Swezey, August, 1921.

N. dodonaeae Muir. *Dodonaea* sp. (8) three males, nine females; *Alphitonia* sp. (8) one male, five females, Swezey, August, 1921.

Aloha.

A. ipomoeae Kirk. *Ipomoea pentaphylla* (6) series both sexes, Giffard and Fullaway, May, 1918.

A. swezeyi Muir. *Cheirodendron gaudichaudii* (5) long series both sexes and nymphs, Giffard, August, 1917; long series both sexes and nymphs off *Bidens pilosa* (5) Giffard, August, 1917; *Campylotheca* sp. (8) series both sexes, Swezey, August, 1921.

Nothorestias.

N. swezeyi Muir. *Aspidium* sp. (8) Swezey, March, 1921.

Dictyophorodelphax.

D. swezeyi Brid. *Euphorbia celastroides* (5) small series, May, 1917; large series both sexes and young, February, 1918, Bridwell and Swezey.

D. praedicta Brid. *Euphorbia hookeri integrifolia* (6) large series both sexes and young, August-September, 1918, Bridwell.

Ilburnia.

I. phyllostegiae (Muir). *Phyllostegia racemosa* (5) long series both sexes and young, Giffard, August, 1917.

I. cyrtandricola (Muir). *Cyrtandra* sp. (5) long series both sexes and young, Giffard, August, 1917.

I. anceps (Muir). *Freycinetia arnotti* (5) four females and four males, Giffard, August, 1917.

I. monticola (Kirk.). *Coprosma montana* (6) long series and young, Bridwell, August, 1918.

I. tetramolopii Muir. *Tetramolopium humile* (6) long series and young, Bridwell, August, 1918.

I. bridwelli Muir. *Argyroxiphium virescens* (6) small series and young, Bridwell, August, 1918.

I. longipes Muir. *Cyrtandra mauiensis* (6) small series both sexes, Giffard and Fullaway, May, 1918.

I. coprosmae Muir. *Coprosma montana* (6) long series both sexes, Giffard and Fullaway, May, 1918.

I. stenogynicola Muir. *Stenogyne kamehamehae* (6) series both sexes, Giffard and Fullaway, May, 1918.

I. kokolau Muir. *Campylotheca* sp. (6) one male, two females, Bridwell, August, 1918.

I. dubautiae Muir. *Dubautia plantaginea* (7) Timberlake, July, 1919.

I. nesopele Muir. *Astelia veratroides* (7) series both sexes, Timberlake, July, 1919.

I. amamau Muir. *Sadleria* sp. (7) very large series both sexes, and young, Timberlake, July, 1919.

I. aku Muir. *Cyanea tritomantha* (7) series both sexes, Giffard, January, 1919.

I. boehmeriae Muir. *Boehmeria* sp. (7) small series and young, Swezey, August, 1919.

I. geranii Muir. *Geranium arboreum* (7) large series both sexes and young, Timberlake, July, 1919.

I. sulcata Muir. *Cyrtandra* sp. (7) small series both sexes and young, Timberlake, July, 1919.

I. blackburni (Muir). *Charpentiera obovata* (5) series both sexes and young, Giffard, August, 1917; *Strongylodon lucidum* (5) series both sexes, Giffard, August, 1917; *Touchardia latifolia* (5) small series both sexes and young (dark form), Giffard, August, 1917; *Cyanea hammatiflora* (6) small series both sexes, Rock, August, 1918; *Clermontia coerulea* (7) series both sexes, Timberlake, August, 1919; *Urera sandwicensis* (7) series both sexes and young, Giffard, August, 1918.

I. neoraillardiae Muir. *Lipochaeta subcordata* (7) very large series both sexes and young, Giffard.

I. gigantea Muir. *Pritchardia* sp. (7) one male only, Swezey, August, 1920.

I. olympica Muir. *Lobelia* sp. (7) small series both sexes, Swezey, August, 1920.

I. chambersi (Kirk.). *Raillardia ciliolata* (7) small series, Giffard, July, 1919.

I. cyathodis var. *lanaiensis* (Muir). *Cyathodes* sp. (6) small series, Bridwell, August, 1918.

I. cyathodis var. *nigrinervis* Muir. *Cyathodes* sp. (6) long series, Bridwell, August, 1918.

I. cyathodis subsp. *eeke* Muir. *Argyroxiphium* sp. (6) long series, Rock, August, 1918.

I. curvata Muir. *Cyrtandra* sp. (6) one female only, Giffard and Fullaway, May, 1918.

I. acuta Muir. *Cyrtandra mauiensis* (6) small series both sexes, Bridwell, August, 1918.

I. waikamoiensis Muir. *Cyanea aculeatiflora* (6) small series and young, Rock, August, 1918; *Cyanea* sp. (7) series both sexes and young, Timberlake, July, 1919.

I. ahinahina Muir. *Argyroxiphium* sp. (6) (8) one male only, Rock, August, 1918.

I. mauiensis Muir. *Campylotheca mauiensis* (6) very long series both sexes and young, Giffard and Fullaway, May, 1918.

I. neocyrtandrae Muir. *Gunnera petaloidea* (6) long series, Rock, August, 1918.

I. mamake Muir. *Pipturus* sp. (6) long series and young, Rock, August, 1918.

I. raillardiicola Muir. *Raillardia menziesii* and *R. platyphylla* (6) long series and young, Bridwell and Swezey, August, 1918.

I. raillardiae (Kirk.). *Raillardia scabra* and *R. ciliolata* (7) long series and young, Giffard, July, 1918.

I. painiu Muir. *Astelia veratroides* (6) small series both sexes, Bridwell, August, 1918.

I. coprosmicola Muir. *Coprosma ernodioides* (6) long series both sexes and young, Giffard, August, 1918.

I. ulehihi Muir. *Smilax sandwicensis* (6) three females and three males, Giffard, August, 1918.

I. nephrolepidis (Kirk.). *Nephrolepis exaltata,** January, August, 1918, January, August, 1919, series both sexes and young, Giffard.

I. ipomoeicola (Kirk.). *Gouldia elongata, Antidesma* sp., and *Cyrtandra* sp. (5) small series with young in instances, Giffard, August, 1917 (probably accidental captures); *Strongylodon lucidum* (5) long series both sexes and young, Giffard, August, 1917; *Mucuna gigantea* (7) series both sexes and young, Giffard, August, 1918; *Polygonum* sp., *Pipturus* sp., and *Rumex* sp. (8) long series both sexes and young, Swezey, August, 1921.

I. lobeliae (Muir). *Kadua glomerata* (6) small series both sexes, Timberlake, September, 1918.

I. viridis Muir. *Phyllostegia* sp. (8) small series both sexes, Swezey, August, 1921.

I. naenae Muir. *Dubautia* sp. (8) series both sexes, Swezey, August, 1921.

I campylothecae Muir. *Campylotheca* sp. (8) small series both sexes, Swezey, August, 1921.

I. kuschei Muir. *Cyrtandra* sp. (8) three females and young, Swezey, August, 1921.

I. koae-phyllodii (Muir). *Acacia koa* (8) small series, Swezey, August, 1921.

I. pilo Muir. *Coprosma ernodioides* (8) very large series both sexes and young, Timberlake, July, 1919.

Kelisia.

K. sporobolicola Kirk. *Eragrostis atropioides* (6) long series, Bridwell, August, 1918; *Eragrostis* sp. (7) one female, one

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* The full series were taken two or three at a time on several occasions on several large plants growing in the *''Algae steam crack''* on the larva flow, within a few hundred yards of the active crater. The heat near steam vents in the crack prevented close collecting. This so-called algae steam crack was since covered by the flow of 1920.

male, Swezey, September, 1920; series, Timberlake, July, 1919.

K. eragrosticola Muir. *Eragrostis variabilis* (6) long series both sexes and young, Giffard and Fullaway, May, 1918.

K. swezeyi Kirk. *Eragrostis* sp. (7) small series, Swezey, September, 1920; *Eragrostis* sp. (8) small series, Swezey, August, 1921.

K. sporobolicola immaculata Muir. *Deschampsia australis* (7) long series both sexes and young, August, September, 1919, Timberlake, Giffard; *Vincentia angustifolia* (7) series both sexes and young (dark var.), Giffard, September, 1919.

Perkinsiella.

* *P. saccharicida* Kirk. (Sugar cane leaf hopper.) Widely distributed on sugar cane since 1902.

Peregrinus.

**P. maidis* (Ashm.). (Corn leaf hopper.) Widely distributed on Indian corn or maize since about 1880.

TABLE V.

ADDITIONS TO ALPHABETICAL LIST ** OF KNOWN HAWAIIAN FOOD-PLANTS † AND OF THE DELPHACIDAE ATTACHED THERETO.

Alphitonia excelsa Reiss. (Kauila). *Nesodryas dodonaeae* Muir.

Antidesma sp. (Hame). *Nesodryas alboguttata* Muir.

Antidesma platyphyllum Mann (Hame or Haa). *Nesodryas fletus* (Kirk.); *Nesodryas haa* Muir.

Argyroxiphium virescens Hbd. (Ahinahina). *Ilburnia bridwelli* Muir.

Argyroxiphium sp. (Ahinahina). *I. cyathodis* subsp. *eeke.* Muir; *I. ahinahina* Muir.

Astelia veratroides Gaud. (Painiu). *I. painiu* Muir.

Bidens pilosa L. *Aloha swezeyi* Muir.

Boehmeria stipularis Wedd. (Akolea). *I boehmeriae* Muir.

Campylotheca mauiensis Hbd. (Kookolau). *I. mauiensis* Muir.

Campylotheca sp. (Kookolau). *I. kokolau* Muir; *Nesodryas seminigrofrons* Muir; *I. campylothecae* Muir.

Charpentiera obovata Gaud. (Papala). *I. blackburni* (Muir).

Cheirodendron gaudichaudii (D. C.) Seem. (Olapa or Kauilamahu) *Aloha swezeyi* Muir.

Clermontia coerulea Hbd. (Haha). *I. blackburni* (Muir).

Coprosma ernodioides Gray (Kukainene) (gen. Pilo). *I. coprosmicola* Muir; *I. pilo* Muir.

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* Accidentally introduced.

** Continued from Proc. Haw. Ent. Soc. III, 4, 1917, p. 345 et seq.

† Specific and native names after Hilbd. Flora Haw. Is. 1888; Rock, Indig. trees of Haw. 1913; Rock, Bot. Bull. No. 2, Bd. Ag. and For. 1913.

Coprosma montana Hbd. (Pilo). *Leialoha lehuae mauiensis* Muir; *I. coprosmae* Muir; *I. monticola* Muir.

Cyanea aculeatiflora Rock (Haha). *I. waikamoiensis* Muir.

Cyanea hammatiflora Rock (Haha). *I. blackburni* (Muir).

Cyanea tritomantha Gray (Aku). *I. aku* Muir.

Cyathodes tameiameiae Cham. (Pukeawe or Maieli). *I. cyathodis* var. *fullawayi* Muir; var. *lanaiensis* Muir; var. *nigrinervis* Muir.

Cyrtandra mauiensis Rock *I. longipes* Muir; *I. acuta* Muir.

Cyrtandra sp. *I. cyrtandricola* Muir; *I. sulcata* Muir; *I. curvata* Muir; *I. kuschei* Muir.

Deschampsia australis Nees. *Kelisia sporobolicola* var. *immaculata* Muir.

Dodonaea viscosa L. var. *spathulata* Sm. (Aalii or Kumakani). *Nesodryas munroi* Muir.

Dodonaea sp. (Aalii). *Nesodryas dodonaeae* Muir.

Dubautia plantaginea Gaud. (Naenae). *I. dubautiae* Muir.

Dubautia sp. (Naenae). *I. naenae* Muir.

Eragrostis variabilis Gaud. (Emoloa or Kalamalo). *Kelisia eragrosticola* Muir.

Eragrostis atropioides Hbd. (Emoloa). *Kelisia sporobolicola* Kirk.

Eragrostis sp. (Emoloa). *K. sporobolicola* Kirk; *K. swezeyi* Kirk.

Euphorbia hookeri integrifolia Hbd. (Akoko). *Dictyophorodelphax praedicta* Brid.

Euphorbia celastroides Boiss. (Akoko). *D. swezeyi* Brid.

Euphorbia sp. (Akoko). *Nesodryas gulicki* Muir.

Freycinetia arnotti Gaud. (Ie-ie). *I. anceps* (Muir).

Geranium arboreum Gray (Nohuanu). *I. geranii* Muir.

Gunnera petaloidea Gaud. (Apeape). *I. neocyrtandrae* Muir.

Ipomoea pentaphylla Jacq. (Kuahulu). *Aloha ipomoeae* Kirk.

Kadua glomerata Hook & Arn. (Pilo? or Au?) *I. lobeliae* Muir.

Lipochaeta subcordata Gray (Nehe). *I. neoraillardiae* Muir.

Lobelia sp. *I. olympica* Muir.

Metrosideros polymorpha Gaud. vars. (Ohia lehua). *L. lehuae mauiensis* Muir; *L. lehuae lanaiensis* Muir; *L. lehuae kauaiensis* Muir; *L. lehuae oahuensis* Muir; *Nesodryas perkinsi* (Kirk.).

Mucuna gigantea D. C. (Kaeëë). *I. ipomoeicola* (Kirk.).

Nephrolepis exaltata Schott. (Okupukupu, Nianian or Pamoho). *I. nephrolepedis* (Kirk.).

Osmanthus sandwicensis (Gray) Knobl. (Pua or Ulupua). *Nesodryas piilani* (Kirk.); *Nesodryas hula* (Kirk.); *Nesodryas semialba* Muir.

Pelea sp. (Alani). *Nesodryas hula* (Kirk.) (one specimen only).

Phyllostegia sp. (Ulihi). *I. viridis* Muir; *N. hula* (Kirk.) (one specimen only).

Phyllostegia racemosa Benth. (Kiponapona). *I. phyllostegiae* Muir.

Pipturus albidus Gray (Mamake). *I. mamake* Muir; *I. ipomoeicola* (Kirk.).

Polygonum sp. (Kamole). *I. ipomoeicola* (Kirk).

Pritchardia sp. (Loulu and Hawane). *I. gigantea* Muir.

Raillardia ciliolata D. C. (Kupaua?). *I. chambersi* (Kirk.); *I. raillardiae* (Kirk.).
Raillardia menziesii Gray (Kupaua?). *I. raillardiicola* Muir.
Raillardia platyphylla Gray (Kupaua?). *I. raillardiicola* Muir.
Raillardia scabra D. C. (Kupaua). *I. raillardiae* (Kirk.).
Rumex sp. (Pawale or Uhauhako). *I. ipomoeicola* (Kirk.).
Sadleria sp. (Amaumau). *I. amamau* Muir.
Saccharum officinarum L. (Ko) Sugar Cane. *Perkinsiella saccharicida* Kirk.
Scaevola chamissoniana Gaud. (Naupaka). *Leialoha scaevolae* Muir.
Sesbania tomentosa Hook & Arn. (Ohai). *Aloha ipomoeae* (Kirk.).
Sida sp. (Ilima). *Nesodryas laka* (Kirk.).
Sideroxylon sp. (Alaa, Aulu or Kaulu). *Nesodryas hula* (Kirk.).
Smilax sandwicensis Kth. (Uhi, Ulehihi & Pioi). *I ulehihi* Muir.
Stenogyne kamehamehae Waw. (Puaainaka, Maohiohi or Mohihi). *I stenogynicola* Muir.
Strongylodon lucidum Seem. (Nukuiwi or Kaiwi). *I. blackburni* (Muir); *I. ipomoeicola* (Kirk.).
Suttonia sp. (Kolea). *N. hula* (Kirk.) (two specimens only); *N. dodonaeae* Muir (one specimen only).
Suttonia sandwicensis (A. D. C.) Mez. (Kolea laulii). *Leialoha suttoniae* Muir.
Tetramolopium humile Hbd. *I. tetramolopii* Muir.
Touchardia latifolia Gaud. (Oloná). *I. blackburni* (Muir).
Urera sandvicensis Wedd. (Opuhe). *I. blackburni* (Muir).
Vincentia angustifolia Gaud. *Kelisia sporobolicola immaculata* Muir.
Zea mays L. (Maize or Indian Corn). *Peregrinus maidis* (Ashm.).

Notes and Observations on Parandra Puncticeps Sharp (Coleoptera).

BY W. M. GIFFARD.

(Presented at the meeting of October 6, 1921.)

In July, 1921, the writer found in the dense, inside forest above the "twenty-nine mile" region in Olaa, Hawaii, at approximately 3800 feet elevation, a particularly rotted stump of *Suttonia,* which had been attacked by this Cerambycid. Due to its decayed condition and the absence of all bark, adult beetles were not seen, but a large number of the larvae and pupae were taken. The most part of these were preserved in alcohol for future study, but a number of the pupae were kept alive to be reared, and were later placed in a glass jar filled with the dry but rotted tree loam from the stump. By the end of August, eighteen adults (nine males and nine